REMARKS

Pending claims

After entry of this amendment, claims 2, 5, and 8-12 are pending.

Claim Rejections – 35 USC 103

Claims 2, 5, 6, 10 and 11

The Examiner rejected claims 2, 5, 6, 10 and 11 under 35 USC 103(a) as being unpatentable over Holen (US 2002/00287070).

The primary purpose of the applicants' invention is to avoid excessive heating of the affected parts of an undersea pipeline, and thereby to avoid high costs and comprehensive implementations. The invention accomplishes this by combining methods using chemical injections/depressurization (the "second plug-counteracting procedure") and direct electric heating. As the second paragraph of the Detailed Description states:

> The present invention is intended [to] work[ ] together with chemical injection and depressurization. Neither chemical injection nor depressurization will function if the hydrate plugs and/or ice plugs have low or no permeability, for which situation the present invention is [provided]. The depressurization will fail when the pressure cannot be reli[e]ved to below the equilibrium pressure for hydrate formation at the ambient temperature, or the depressurization results in formation of ice plugs. Heating of the pipeline contents by direct electric heating to above the ice melting point will remedy the situation. As the temperature increases the ice is melted closest to the pipeline wall, the permeability increases, such that chemical injection and depressurization become possible.

Holen does not specify or even mention the possibility of such a combination and consequently fails to achieve the same beneficial results as the invention. It would therefore not be obvious for a skilled person, given Holen, to choose *not* to remove hydrates by direct electric heating, and in addition to combine direct electric heating and chemical injection or depressurization.

The only example in Holen's description is that for melting hydrates the temperature must be increased from -2°C to typically +19°C. This requires a power demand of at least 60 kW. The current supply would thus have to be about 8 kA, which is far above the capacity both of a single cable and of existing generator systems on supply vessels. With the

applicants' invention, the power demand is 3.9 kW and the system current need be no more than about 1.7 kA, which is far less than that required for melting hydrates.

In addition to above-mentioned restrictions, removal of both ice and hydrates would imply a greater control of the heating rate and time so as to avoid the highest impedance pipe joints become so hot that they might damage the insulation materials.

Claim 5 therefore defines the invention to have an important, technically advantageous feature that is not only completely lacking in Holen, but that would not be obvious simply to add to Holen's arrangement.

Claims 12 and 13

The Examiner rejected claims 12 and 13 under 35 USC 103(a) as being unpatentable over Holen in view of Ness (US 6,328,583).

Claim 13 has been canceled and incorporated into claim 12.

Ness relates to a re-connectable pipeline connection for a direct heating system. In Ness, there is no vessel having any means with capacity to deliver sufficient current and there is no riser cable extended for contact between the vessel and the pipeline. Ness focuses instead solely on a connector and the installation of the connector. As can be seen in Ness (see, for example, column 2, line 11), the lines extending from the seabed to the vessel are merely lines or wires for undertaking the installation of connections, which are at the end of a heating cable.

Even a hypothetical combination of Holen and Ness would therefore still not teach all of the features of the applicants' invention as claimed in claim 12; Holen and Ness together still would not provide the skilled person with sufficient information to obtain the riser cable recited in claim 12.

Claims 7-9

The Examiner rejected claims 7-9 under 35 USC 103(a) as being unpatentable over Holen in view of either Firmin (US2004/0253734) or Agee et al (US 2003/0178195).

It is well-established that there should be some suggestion in Holen to combine it with either Firmin or Agee; otherwise, any such combination is simply an exercise in hindsight.

The applicants explain above how Holen fails to consider the possibility of anything except direct electric heating. A combination of Holen with either Firmin or Agee would require a skilled to realize the possibility of greatly limiting the required electric power. In other words, to combine Holen with either Firmin or Agee would require inventive insight in itself – it would require the applicants' invention.

Conclusion

The two pending independent claims as amended each recite at least one technically advantageous feature of the invention that is lacking in Holen and that would not obviously be incorporated into Holen given the secondary references. The applicants therefore respectfully submit that the claims should now be allowable over all the cited prior art.

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